

# SCIENCE.—SUPPLEMENT.

FRIDAY, MARCH 26, 1886.

## EDUCATIONAL TENDENCIES IN JAPAN AND IN AMERICA.

It has for some time past been a cause of wonder that the bureau of education has been able to do so much and so good work with the limited means at its disposal, and receiving but slight recognition from the other governmental departments. Two recent circulars of this bureau will, by their great interest and value, serve to increase this wonder.

One of them deals with education in Japan.<sup>1</sup> The population of the empire in 1882 was 37,041,368, and the school population, comprising all children between the ages of six and fourteen, made up 5,750,946 of this number.

Education is given more official consideration in Japan than here, for it constitutes one of the ten departments of the privy council, and has a minister allotted specially to it. The school organization follows closely the division of the empire for administrative purposes into nine circuits and eighty-four provinces. A school committee is organized in each minor civil division, ward or village; and it conducts all business relating to school attendance, the establishment and maintenance of schools, etc., within its jurisdiction. The tenure of such a committee is not less than four years, and it is composed of men selected by the governor of the province, from a list nominated to him by the citizens of the school district. A committeeman must be over twenty years of age, a property-holder, and a *bona fide* resident of the district from which he is nominated. The directors, librarians, professors, and teachers are appointed and dismissed in various ways, according to the importance of their office. Some are appointed and dismissed by the emperor himself, others by the prime minister on the recommendation of the minister of education, others by the minister of education himself. Their salaries range from 4,800 yen (one yen is equivalent to 85.8 cents) in the case of a rector or a professor of highest grade, to 540 yen or less in the case of an ordinary teacher.

Education has been under government super-

vision in Japan since 270 A.D., but it was in the years from 1868 to 1871, following the political reform of the country, that it was placed on its present footing. The present educational code only dates from 1880. The school system comprises kindergarten, elementary schools, middle schools, and a university at Tokio. There are also female schools, commercial and industrial schools, and normal schools for the training of teachers. Nineteen libraries and four museums of high rank are under the control of the department. Students are frequently sent abroad to complete courses of study, fifty having been so sent since 1875. Twenty-two such students are abroad at present, seventeen of whom are in Germany. The school funds are raised as part of the national taxes, and the lands occupied by schools are usually government lands: when they do not belong to the government, they are exempt from taxation. In 1881 the educational expenses of the empire amounted to 6,591,878.123 yen,—about 36 per cent of the total expenditure. 8.8 per cent of the entire population were under instruction in 1883 in 30,156 elementary schools, engaging the services of 24,605 teachers, 1,878 assistant teachers, and 64,017 pupil teachers.

The second of the reports to which we have referred is no less replete with information than the former, but from its character it contains more that is suggestive. It was drawn up by the late Charles O. Thompson, Ph.D., of Terre Haute, Ind., and is an essay on technical instruction in Europe.<sup>1</sup>

Into the details of this report space forbids us to enter, but it is a valuable compendium of the system and methods of technical instruction in the various countries of Europe. America is by no means deficient in recognizing the importance of technical schools; but we need to learn all we can on this subject, and call to our aid, when attainable, the experience of other countries, for technical education bids fair to be the education of the future. In our development of free education we have tended to overestimate the dignity of the professions and to underestimate the dignity of the trades. From Germany comes the cry that there are too many educated men, and not enough places for them; and in our large cities we see

<sup>1</sup> Circulars of information of the bureau of education. No. 4, 1885. Education in Japan. Washington, Government, 1885. 8°.

<sup>1</sup> Circulars of information of the bureau of education. No. 3, 1885. A review of the reports of the British royal commissioners on technical instruction, with notes, by the late Charles O. Thompson. Washington, Government, 1885. 8°.

hundreds more lawyers and doctors than can obtain a decent living.

The remedy for all this must lie largely in technical education. Teach a trade and the practical application of principles, and inculcate the lesson that no calling is dignified in itself, but it becomes what those who follow it choose to make it. We believe that Professor Thompson's essay is a positive contribution to our knowledge of this subject, and therefore should be carefully studied by all who are interested in education.

NICHOLAS MURRAY BUTLER.

*THE CHARACTERS OF CHILDREN AS EVIDENCED BY THEIR POWERS OF OBSERVATION.*

THE study of the powers of observation in children has been seldom attempted in a systematic way; and yet, with the tendencies and aims of modern education, there can scarcely be any subject from which might be expected more fruitful results. Professor Farlow, in his recent address before the Society of naturalists, has asserted that the schools, in the last six or seven years, have made no perceptible progress in developing these powers, and that, so far as elementary training is concerned, we are about where we were ten years ago. Furthermore, in his own experience, he finds that the tendency of education, in the lower schools at least, is to impair, rather than to sharpen, the natural powers in this respect. Considering how important an element of successful work, in most careers, this faculty is, one cannot fail to appreciate the value of experiments that may throw light upon remediable mental defects, or upon mental excellences, in childhood.

At the suggestion of Mr. Francis Galton, Mrs. Sophia Bryant, D.Sc., has recently<sup>1</sup> attempted a series of such experiments, the results of which, though subject to fallacies, will point out a fruitful line of investigation.

Her method was the analysis of the characteristics evinced in the description of given objects by a number of school-children, all of whom were of the same age (thirteen years), and unknown to her. For this purpose they were allowed to remain for about ten minutes in a room which they did not know, and were then required to write a description of it. The one first described was a schoolroom, having certain features in common with other schoolrooms familiar to the children, but having certain others peculiar to itself, and a sufficient amount of ornament, in pic-

tures and otherwise, to redeem it from being quite prosaic. The results of her analyses were afterwards compared with the characteristics as given by the children's teachers; from which comparisons, in many cases, striking agreements were found. Of course, in such experiments, as the author rightly says, only repeated and varied trials can eliminate the chances of error; and much less weight should be attached to negative than to positive results. The points thus brought out were as follows:—

1°. In the perception of an object a logical distinction is made between the sense-impression and the apprehension of it by the mind, as between the passive and active factors of perception. Apprehension is essentially the bringing of the new into relation with the old, and thus interpreting the new by means of the old.

In the ratio of these two factors of perception to each other, there were found signs of great variety. Impressions were sometimes numerous and faithful where the power of giving them a meaning, and thus perceiving them fully, was clearly very slight, or at least inoperative. In such cases the perception was what would be ordinarily called unintelligent. In other cases the impressions either made, or at any rate dwelt upon, were fewer, but the apprehension of them was very complete. This completeness of apprehension or understanding occasionally passed beyond the limits of full and accurate perception into pure inference. Sometimes the inference was correct, and that not by chance, since it had the marks of having been cautiously conducted. Such little phrases as 'I suppose,' or 'it is likely,' are tell-tales here, as marking off the cautious from the reckless thinker. This latter person was betrayed also by a very unmistakable hastiness of inference, which in the bad cases degenerated into actual false perception. For instance: the name 'C. W.' in the corner of a picture was reported as 'M. W.,' this being the name of a girl in school whom the young observer knew very well.

It was found, as indeed might naturally be expected, that the false perceivers were nearly always ready apprehenders, who, apparently digressing into actual inference, inferred carelessly, and projected their false inferences into false perceptions. The carelessness of such inference is of a very simple character: the impressions to the test of which the inference should be brought are there, and it is not brought to the test. This argues absence of the impulse to criticise, which is the basis of accurate habits of thought. Feebleness of the impressions is, it must be admitted, a negative cause for the false perceptions, since the test is thus kept in the background; but it is only

<sup>1</sup> *Journ. anthropol. inst. of Great Britain and Ireland*, xv. 338, February, 1896.

a negative cause, since, if the critical impulse were really strong, the inference would be challenged at least, even if it could not be corrected. In judgments, however, as to character-tests, it would be necessary to estimate this negative cause as otherwise indicated, and allow for it before deciding on the degree of the critical defect.

2°. In the second place, differences were observed in the degree of orderliness with which perceptions are marshalled, and in the general notion of order which characterizes any particular observer.

Out of twenty observers, eight gave evidence of no noticeable interest in order at all: the objects appeared to have been observed haphazard, as far as their relation to one another logically, or in place, went. On the other hand, seven descriptions were as orderly as they could well be expected to be; while to three, half marks were given, and to one two-fifths. In most of the orderly descriptions the order chosen was that of place,—the order of the inventory round the room, some starting from the door, some from the opposite point, and some from the clock in the middle. In one or two the order was logical; i.e., the order of what may be called the idea of the room, as in one paper which begins, "The first thing that strikes you are the rows of desks and girls." In another set of papers, describing a more ornamental kind of a room, signs were found of a third kind of order, sometimes very strong,—the order, namely, of aesthetic effects; the order in space, and in idea too, being subordinated to the order in feeling for the beautiful.

3°. Great differences in color-interest were also observable, since some took pains to describe colors fully, while others took no notice of color at all, or very little. In the same way, any marked interest in form was also shown; though in the experiments under consideration no call was made upon the form-interest so strong as to test defect by the absence of response.

4°. One other characteristic, and a most important one, came out into strong relief in a few cases. This is the tendency to substitute feeling for thinking, to apprehend impressions as the minimum of idea with the maximum of emotion, which may be called, for simplicity, over-emotionalism. An over-emotional person perceives objects habitually as sources of feeling; and that is, of course, equivalent to not properly perceiving them at all. Now when, in the description of a room, a child tells you that it is very beautiful, and there are lovely curtains, and the sweetest flowers, and pretty ornaments, it may be considered an evident mark of over-emotionalism, and should, in the educational interest, recommend a whole-

some diet of ideas accordingly. The negative defect—for, after all, it is a defect—of under-emotionalism is, like all negative defects, difficult to test; but the freedom from defect reveals itself every now and then in little touches that are very subtle.

In other observations made, a picture was used as a test. The same contrasts as before were to some extent brought out in the various descriptions of the picture; but there was occasion for another set of contrasts in these cases, and these contrasts came out decidedly. To see a picture in the full sense is to understand its meaning, and in the interpretation of meaning there is abundant scope for the most varied play of imagination, whether checked by faithful observation or not. Just as the perception of an object resolves itself into the two factors of impression and apprehension, so the observation of a complex of objects resolves itself into the two factors of perception and explanation by means of appropriate fetches of the constructive imagination. Now, in some children there was found abundant and accurate perceptive detail, with something like the minimum of constructive explanation. In others the opposite extreme was manifest, explanation good, and details little dwelt upon or even described with imperfect accuracy. Between these extremes the two factors were combined in various ratios, including the ratio of equality characteristic of the well-balanced type of mind.

Again, varieties in the nature of the imaginative play, which suggested well-marked contrasts of general character, were observed. Sometimes the play of imagination was almost purely intellectual, strictly subordinated to the purpose of fetching ideas for the explanation of observations. This may be called the logical or intellectual imagination. In other cases the fetch of imagination was not so much after ideas to construe with, as after feelings to luxuriate in: the ideas are overpowered in a mass of vague associated emotion. This, if it can be called imagination at all, may be marked out as the emotional variety; and a touch of it is not, of course, out of place in describing an object like a picture, which has distinct aesthetic bearings. But most striking of all were the examples of dramatic imagination, which were not rare: here the picture is lost in the story which it is interpreted as meant to tell; the picture becomes the occasion for a departure into story-land, instead of remaining, as in the first case, the main fact, solely for the explanation of which such departures are at all allowed, and by which they are limited. Besides these marked cases, there were doubtful cases, and cases negative altogether. Sometimes, too,

the play of imagination was markedly careless, and uncontrolled by the inward critic, as compared with the good cases in which it showed itself sober and self-controlled.

As the author says, the sources of error in such observations as these are very numerous; but from repeated observations by many observers, carefully collated, these errors may be in a great measure eliminated, and substantial results arrived at, of whose practical bearing there can be little doubt.

#### OBSERVATIONS UPON DIGESTION IN THE HUMAN STOMACH.

DIRECT observations on digestion in the human stomach have been very seldom made, as opportunities for such cannot often occur. Those by Beaumont many years ago are familiar to every student of physiology, and, notwithstanding their lack of completeness and their many imperfections, they served a very useful purpose in explaining many of the processes whereby digestion is affected in this organ. These observations have been supplemented by others; but the results of modern physiological researches have been such, that renewed opportunities to make such direct observations must be of great value. Such a one occurred within the past year in the person of Heinrich Baud, a healthy young man twenty-eight years of age, into whose stomach, in consequence of a stricture of the oesophagus that prevented the passage of all food, a surgical opening five centimetres in length was made. The case passed into the hands of Mr. A. Herzen, the well-known physiologist, who improved the opportunity to make a series of experiments upon the digestibility of certain foods and upon the behavior of the gastric juices (*Kosmos*, 1885, ii. 1, 4). The pepsin secreted by the patient was of unusual quantity, and, what has hitherto never been observed in similar cases, or through the artificial fistulas of dogs or other animals, there was a changeable but often considerable quantity of bile present. These circumstances, however, though complicating the experiments, did not especially affect the results.

The author's methods of experimenting were as follows: a substantial meal was given to the patient at 7 o'clock in the evening, and nothing further was permitted to enter his stomach till the next morning, when experiments at 6 o'clock were begun, first upon the empty organ. After an examination of the juices therein contained, there was introduced the albumen from three hard-boiled eggs, with two to three hundred grams of water, together with three small silken nets, each containing eight small pellets of albumen, uniform

in size, and regular in shape, and which could be easily withdrawn for examination. These observations through the fistula were made hourly, and one of the nets with its contents removed.

Remarkable and unaccountable conditions were found in which the albumen remained one or even two hours in the stomach without undergoing any perceptible change, notwithstanding the presence of ferment, with which it was impregnated. In these cases the albumen pellets usually retained in their substance precisely the requisite quantity of pepsin for their solution, which, under favorable circumstances afterwards, exactly sufficed to digest them. This furnishes evidence that the pepsin does not act through simple contact alone, and that a given quantity of it can dissolve only a given quantity of albumen, and that consequently the pepsin, by the exercise of its digestive activity, loses its entire potency.

Observations directed toward the ascertainment of the time required for the stomach-juices to impregnate coagulated albumen showed that they penetrated about one millimetre during the first hour and three millimetres within the second. It was also learned that the acids were much more active than the pepsin in penetrating the substance. This last fact furnishes a new proof of the presence of a free acid in the stomach-juices. The juices, however, at such opportunities as it was possible to examine them, were sometimes found to be of a neutral reaction. But, in order to test the action of acid and ferment further, he introduced at times a quantity of soda to neutralize the acid; without, however, materially affecting the activity of the pepsin, although it appeared to somewhat diminish it. It therefore results that pepsin exerts its digestive power almost wholly independently of the acid. The reverse of this, as may be expected, was also found true, — that the acids penetrated the albumen in the absence of the pepsin, and, when the pieces of albumen were small, a sufficient quantity was absorbed to digest them.

Another series of researches was made upon the fluids of the stomach, from which it was found, that, on the mornings after fasting, the secretion usually was small, while at such times following the ingestion, during the night, of milk or any fluids containing alcohol, the secretion was greater. During the first hours of digestion the quantity held a definite relation to the volume of substances introduced, while in the fifth hour the quantity was always more abundant, about three or four hundred grams. The first secretion of the morning was in general a somewhat thick, very stringy, more or less clear fluid, which resembled the white of an egg; that obtained during the



process of digestion was less thick and less stringy ; while that of the fifth hour was turbid, thin, and little or not at all stringy.

Of the hundred and forty-two specimens examined, one hundred and seven showed a yellow or green color, more or less intense, and which indicated the presence of bile. It is worthy of note, that, despite the almost constant presence of bile in the stomach, the digestion was not perceptibly disturbed, and analyses of the contents of the stomach during different hours of digestion clearly proved that the activity of the fluids was not impaired by its presence. It was also observed that the entrance of bile into the stomach partook of a sort of periodicity, a less quantity being found during the first two hours of digestion than at the time either before or after, and that the quantity was still less during active digestion, when fluids, especially beer, were taken in.

The hydrochloric acid of the juices during digestion was found, in a mean of eighty-seven examinations, to be from 1.8 to 1.9 per cent in weight of the entire quantity,—a somewhat higher percentage than that given by Richet. The acidity gradually increased during the first hours of digestion, reaching its maximum at the third hour, from which time it gradually decreased. A few times the juices were found neutral, and the highest acidity attained was 4.2 per cent.

Since Dr. Koch has shown that an acidity equivalent to two per cent of the gastric juices suffices to destroy the cholera microbe, it has been recommended that table-salt should be employed during cholera epidemics to increase the quantity of acid in the gastric juice, and thus prevent the entrance of these germs into the alimentary canal ; but from a series of experiments it was ascertained that the direct reverse was the result, and that the larger the quantity of salt introduced, the more considerable and permanent was the decrease of the acidity, so much so that at times the juices were rendered entirely neutral. Contrary to the opinions which have been expressed by physiologists, that salt increased the activity of the secretion of pepsin, experiments seemed to prove that it hindered such secretion, and when large quantities were taken, either into the stomach or by injection, the stomach digestion was most impaired. Mr. Herzen, however, would by no means deny the probability that salt injected directly into the blood increases the secretion of pepsin. On the other hand, it was established that the introduction, either by the stomach or the rectum, of some good peptogenic substance, such as broths or dextrine, uniformly hastened digestion in the stomach, and that this resulted independently of

the increase of acidity, and despite the frequent presence in the stomach of the contents of the duodenum. In other words, the digestion may be hastened, and a richer secretion of pepsin brought about, by their use ; while others, such as tea, wines, and grape-sugar, produce no effect whatever. Of the practical results of such observations, corroborating and adding to, as they do, conclusions previously and in other ways arrived at, there can be no doubt. Those who would aid an impaired digestion may seek in certain foods, such as broths, stale bread, milk or coffee, taken a while before regular meals, efficient helps ; while alcoholic drinks, and especially the sour wines, sugars, and others, may be not only of no use, but even actually prejudicial. To the child and the invalid the results are no less useful.

#### BLINDNESS IN RUSSIA.

At the first congress of Russian doctors, which was held in January last, many important papers were read, followed by discussions of considerable interest, some of the most eminent members of the profession from the different provinces and universities of the empire taking part in them. A very striking contribution to the study of social and sanitary questions, says the *Lancet*, was afforded by a paper by Dr. A. T. Skrebitski, on the 'Distribution and statistics of blindness in Russia.' The data employed were chiefly those collected by the military authorities who have to examine young men as they become liable to service in the army. Taking the total for the five years 1879 to 1883, the number examined was 1,388,761, of whom 13,686, or almost one per cent, were blind in one or both eyes. In certain districts the proportion was much higher than the average ; and some of the largest, or rather most populous, provinces seem to have presented the greater proportion of the blind : thus in that of Kieff, which sent up almost the largest number of recruits,—namely, 43,118,—no less than 660, or 1 in every 65, were found to be blind in one or both eyes. The smallest proportion of blind was found in Archangel, where it was 1 in 390 ; but even this is far above the proportion in other European countries.

To make the comparison with the statistics of other countries, it is necessary to subtract the number of those blind in one eye, which in Russia is found to be only a fifth of the total blind : thus, we may consider that four-fifths of the 13,686 recruits returned as blind were blind in both eyes, so that the ratio of totally blind is about 1 to 125. The ratio in England and Ireland is 1 to 1,015, and that in several other European coun-

tries is still lower, being 1 to 1,406 in Saxony, and 1 to 1,429 in Denmark. Dr. Skrebitski's paper attracted a considerable amount of attention from the lay press, the *Novosti* remarking, "We have surpassed Europe not only in mental but in physical blindness." To any foreigner, however, who reads the Russian medical journals, the valuable original communications with which they literally teem would appear to indicate the reverse of 'blindness,' in the Russian scientific world at all events.

#### BANCROFT'S HISTORY OF ALASKA.

THE history of Alaska, up to the time of the American purchase, has two divisions into which it naturally falls,—the period of independent Russian traders, fighting and competing on every hand; and the period of organized monopoly, which succeeded that competitive anarchy. Explorations of a rude sort, the vices of the semi-civilized Cossacks, and the rage for wealth represented by sea-otter skins, went hand in hand. A myriad of petty traders, bold, energetic, lustful, and avaricious, after the return of Bering's expedition, swarmed upon the Aleutian Islands, trading, hunting and robbing the natives, occasionally being slaughtered in return.

Of this period, with the causes which led to it, and its consequences for Russia and for America, Mr. Bancroft gives an extremely full and almost interesting account. Parts of it are dramatic; but the annals of so many petty expeditions with the same object, and almost always substantially similar results, cannot but be rather monotonous. Though much of the material is of only approximate accuracy, and derived from scattered and unverifiable copies of old records long destroyed, Mr. Bancroft has given what would seem to be by far the best account extant, and one not likely to be improved upon.

Of the second period we have also a remarkably full and acceptable account of the formation, fortunes, and fate of the monopoly known as the Russian American company, and of Alexander Baranoff, the man of all others characteristic of the Russian occupation of Alaska, the Peter the Great of the territory. Of history in its widest sense, the grasp of underlying motives,—the reaction of European politics, the growth of the United States, and other large forces upon the springs which governed events on the north-west coast,—there is little: the volume is rather materials for history, than history. But it is for the Russian period a very full, and in the main

sufficiently accurate, chronicle of events. Of the period succeeding the purchase (a much more difficult task) less can be said in praise. A similar division of this epoch will by its future historian be found applicable. The era of violent and unrestrained competition in this case, however, lasted only two or three years; while the monopoly which succeeded, though more confined in scope than that of the Russian company, does not differ in its essential characters, and is still in operation. The chronicle of events since 1867 is full, but by no means complete. The scientific investigations, which have been a marked feature in the recent development of the territory, are very unequally treated, and many of them pass with a bare mention; others are ignored altogether; while a disproportionate space is given to the petty affairs of the trade-monopoly above referred to. There are numerous errors of detail; and the just reprobation of misgovernment and lawlessness, which the (mostly foreign) fur-traders under American sovereignty should share with the still viler authors of the early Russian trade, seems to have been reserved for the former in unreasonable proportion. This period, however, is so much nearer the historian, so many of the actors in it are still in the active pursuit of their business, and the passions and prejudices engendered by recent rivalry are still so hot, that historical impartiality is not to be expected.

Mr. Bancroft recognizes the wealth of the territory, and gives an excellent account of its hardly touched resources, other than the fur-trade. He very justly and severely criticises the inaction of congress, which has left the territory at the mercy of law-breakers for more than fifteen years, has only recently accorded a merely nominal and almost impotent form of government, and in the past has saddled upon the inhabitants, in lieu of the law they had a right to, a succession of corrupt or inefficient petty officials. The book has an excellent index, and numerous small sketch-maps in the text. The general map of the territory is bad, out of date, and in nomenclature discrepant with itself and with text, beside containing several inexcusable and wholly original blunders.

#### OCEANA.

SIR ARTHUR HELPS once said that when Lord Palmerston was forming a new ministry, not so very many years ago, he was at loss for a colonial secretary. This name and that was suggested, and thrown aside. At last the noble lord said,

*Oceana; or, England and her colonies.* By JAMES ANTHONY FROUDE. New York, Scribner, 1886. 8°.

*History of Alaska, 1730-1885.* By HUBERT HOWE BANCROFT. San Francisco, Bancroft, 1886. 8°.

"I suppose I must take the thing myself. Come up stairs with me, Helps, when the council is over. We will look at the maps, and you shall show me where these places are." It occurred to Mr. Froude that it would be a good thing not merely to find out where the colonies were, but to make a tour among them, to talk to their leading men, see their countries and what they were doing there, learn their feelings, and correct whatever erroneous impressions he himself shared in common with his countrymen. He sailed for Melbourne in the beginning of December, 1884, in the new steamship *Australasian*; and on the 16th of May, 1885, he landed at Liverpool from the decks of the *Etruria*, on her first return voyage from New York. In this volume the events of that trip around the world are most charmingly narrated.

His first encounter, however, was with an inhabitant of an island much nearer Downing Street than New Zealand. He thus narrates the incident: "I saw an Irishman in the unmistakable national costume, the coat-seams gaping, the trousers in holes at the knees, the battered hat, the humorous glimmering in the eyes. I made acquaintance with him, gave him a pipe and some tobacco, for he had lost his own, and tempted him to talk." The man, who had probably never heard of Mr. Froude or his books, opened his heart to him. After describing how the Manx men had come down and taken all the herring in his neighborhood (for it seems that he was a fisherman), he went on: "And then there was the bit of land"—here he paused a moment, and then continued, "Thim banks was the ruin of me. I had rather had to do with the worst landlord that ever was in Ireland than with thim banks. There is no mercy in them. They'll have the skin from off your back." Poor fellow! No sooner had he got fixity of tenure than he had borrowed money on the strength of it, and the result was emigration to the antipodes. "How many hundreds of thousands of his countrymen will travel the same road?" queries our author.

A few hours only were devoted to the Cape of Good Hope; for Mr. Froude had sojourned there ten years before, and had seen all of the misgovernment of that colony that he desired. Adelaide was merely glanced at, but a long and interesting visit was paid to Melbourne and Sydney. A trip was taken to Ballarat, Bendigo, and other points in the interior of Victoria. Everywhere he was well treated, and everywhere he saw nothing to blame and much to praise. He was in a land where patriotism was not "a sentiment to be laughed at—not, as Johnson defined it, 'the last refuge of a scoundrel,' but an active passion." He predicts a glorious future

for Australia. People wrote to him afterwards that he had purposely been shown the bright side of things, "that we let ourselves be flattered, be deluded, etc. Very likely. There was mud as well as gold in the alluvial mines. The manager pointed out the gold to us, and left the mud unpointed out. The question was not of the mud at all, but of the quality and quantity of the gold. If there is gold, and much of it, that is the point. The mud may be taken for granted." Rather a dangerous method of investigation, one would say, and a method the pursuing of which has destroyed much of our faith in Mr. Froude's deductions.

He next passed over to New Zealand, this time in an American steamer. But though the captain and the steamer were American, the crew was not. Indeed, our author, puzzled to make out what they were, asked the captain how he had picked them up. "I make a rule," the captain replied, "to take no English, no Scotch, no Irish, no Americans. They go ashore in harbor, get drunk, get into prison, give me nothing but trouble. It is the same with them all, my people and yours equally." He preferred Danes, Norwegians, Germans, Swedes, and Chinamen. It took five days to make the voyage from Sydney to Auckland. Then followed a month mainly devoted to sight-seeing in the wonderful volcanic interior of the North Island. This part of the book is well illustrated, and we remember no better description of the last retreat of the Maori. In fact, it makes one wish that the author had devoted more of his time to descriptive writing, and less to historical dissertations.

From Auckland he voyaged to San Francisco *via* Honolulu. It is always pleasant to hear one's country and countrymen praised, and Mr. Froude has been by no means stingy of praise when speaking of us. "The Americans," he declares, "are the English reproduced in a new sphere. What they have done, we can do. The Americans are a generation before us in the growth of democracy, and events have proved that democracy does not mean disunion." But all the desirable results were not brought about by the spirit portrayed in the following sentence. He has been speaking of the scheme for a real imperial parliament (something akin to our congress) to take charge of the 'foreign and colonial policy' of a federated British empire,—Oceania,—and says, "Of all the amateur propositions hitherto brought forward, this of a federal parliament is the most chimerical and absurd." Why? it may be asked. Because the English house of commons is omnipotent, is the reply. "Who is to persuade it to abdicate half its functions, and construct a superior

authority which would reduce it to the level of a municipal board?" It may be safe to say, that, until the English house of commons does consent to divide its authority with some kind of a legislative body in which the Englishmen who happen to live in Canada and Australia shall have a voice, every scheme for an 'Oceana' will prove 'chimerical and absurd.'

#### MINOR BOOK NOTICES.

*New theories of matter and force.* By WILLIAM BARLOW. London, Sampson Low & Co., 1885. 8°.

MOST theorists, in seeking to escape from the difficulties in the way of an adequate conception of the luminiferous ether, would hesitate to embrace a theory which involved either the denial of the conservation of matter or the acceptance of the emission theory of light; and yet the author of 'New theories of matter and force' has no craven fear of either or both of these conclusions. Ordinary matter, he conceives, is a mixture of two hypothetical ethers in a highly condensed state. The properties of these ethers are peculiar. Both have inertia, and, when unrestrained, expand indefinitely like gases. One is more compressible than the other, and cohesion in each is proportioned to the density. To avoid all appearance of action at a distance, this cohesion is not supposed to be an attraction, but rather a clinging-together of contiguous particles. This seems to require these ethers to be continuous; but this is no serious embarrassment to our author, who finds no difficulty in reconciling perfect continuity of substance with any desired degree of compressibility. Owing to the diminution of the cohesion with the density, these ethers have the remarkable property that the expansive force increases as the volume becomes greater. By means of these two ethers we have the fundamental machinery for the complete explanation of matter, gravitation, light, heat, and electricity. The greater part of the book is devoted to the application of the theory throughout the whole realm of physics, supplementary hypotheses being courageously introduced when necessary. The main phenomena of light are explained by a combination of the wave and emission theories, as interpreted in the light of two ethers. It is much to be regretted that the author, before publishing his theory, did not subject it to a scrutiny at least as rigid as that which led him to reject the accepted views. The scientific imagination has an important use when stimulated by knowledge and guided by reason; but before we lightly cast aside those theories which are the result of the most profound

thought, not of one mind, but of many, and which have been slowly elaborating during patient years, and set up in their stead our own brief conceits, we may well pause and consider.

*The determination of rock-forming minerals.* By Dr. EUGEN HUSSAK. Translated by Dr. E. G. Smith. New York, Wiley, 1886. 16°.

THIS is a work of which we cannot speak favorably. Dr. Smith's evident lack of acquaintance, both theoretical and practical, with the subject, has compelled him to make a close literal translation from the original; and, as would be expected, numerous errors have thus crept in, in addition to the many in the original. The whole spirit of the German language is such that close translations of technical works are rarely happy in their results—certainly never, except when one is most thoroughly familiar with both the language and the subject under consideration. It is very much to be doubted whether Dr. Smith possesses either of these qualifications; otherwise he would never have made such errors as 'the entrance face of the light' (*eintrittsfläche*) for 'plane of incidence,' and 'shell-formed' (*schalenförmig*) for 'zonal.'

*Along Alaska's great river.* By FREDERICK SCHWATKA. New York, Cassell, 1885. 8°.

THIS excellently illustrated volume describes the journey of Lieutenant Schwatka's exploring-party from Portland, Ore., through the beautiful inland passage along the north-west coast of America, as far as Sitka in Alaska, thence overland to the head waters of the Yukon River, which was explored with considerable accuracy by his expedition as far as Fort Yukon. Schwatka's raft-journey down the Yukon, and his explorations in that region, have been often referred to in these columns. Capt. C. W. Raymond, of the engineer corps of the army, had surveyed and charted the Yukon River from Fort Yukon to its mouth, about a thousand miles, as early as 1869, and Schwatka pays a deserved tribute to the accuracy of that officer's work. In fact, the large chart of reference accompanying the volume appears to be a reduced copy of Raymond's chart, which is said to be the best in existence of that part of the great river. It is to be regretted that Schwatka's time for this exploration was limited to one short summer, and that his arrival at St. Michael's had to be so arranged as to anticipate the departure of the last vessel going south from that point in the fall. Otherwise it is almost certain that he would have explored a much wider region, thus adding much to our knowledge of that almost unknown American territory.



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